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PLANETARY PHENOMENA FOR NOVEMBER AND
DECEMBER, 1916.

BY MALCOLM MCNEILL.

PHASES OF THE MOON, PACIFIC TIME.

First Quarter. Nov. 2d. 9 ^h 51 ^m A.M.	First Quarter. Dec. 1st, 5 ^h 55 ^m P.M.
Full Moon... " 9th, 12 18 P.M.	Full Moon... " 9th, 4 44 A.M.
Last Quarter. " 17th, 2 0 P.M.	Last Quarter. " 17th, 10 6 A.M.
New Moon... " 25th, 12 50 A.M.	New Moon... " 24th, 12 31 P.M.
	First Quarter. " 31st, 4 7 A.M.

The fifth and last eclipse of the year, a *Partial Eclipse of the Sun*, will occur December 24. The maximum obscuration of the Sun will be only one hundredth of its diameter, and it will be visible only in the regions far south of Africa.

The Moon will again occult the *Pleiades* group on December 7th, but nearly all of the occultations will take place before moonrise in the United States.

The Sun reaches the winter solstice and begins to move northward on December 21st, 7^h 59^m Pacific time.

Mercury is a morning star on November 1st, and rises a little more than an hour before sunrise, in fair position for observation. It gradually approaches the Sun, passing superior conjunction and becoming an evening star on the night of November 23d. It gradually increases its distance from the Sun, and shortly after the middle of December it attains a sufficient distance for visibility in the evening twilight. At the end of the month it remains above the horizon nearly an hour and one-half, and is then an easy naked eye object. It will reach greatest east elongation in January.

Venus is still in the morning sky but is gradually drawing nearer to the Sun. On November 1st it rises about three and one-half hours before sunrise and this interval diminishes to a little more than two hours by the end of December. It will also diminish perceptibly in brightness due to its increased distance from the Earth. It will, during the two months, move 71° eastward and 23° southward among the stars from the western part of *Virgo* thru *Libra* into *Scorpio*. On November 20th it passes about 4° north of the first magnitude star *Spica*, and on December 28th it is about 5°

north of the first magnitude star *Antares*. It passes its perihelion on November 11th, but the orbit is so nearly circular that this makes very little difference in appearance or apparent motion. This is very different from the conditions in the case of *Mercury* and *Mars*, whose orbits are relatively very eccentric. In these latter the situation of the planet with reference to perihelion or aphelion causes a variation of quite a number of days in time of conjunction or greatest elongation.

Mars is gradually approaching the Sun and by the end of December sets just about one hour after sunset. On November 1st the interval is about an hour and one-half. As the planet is now nearly at its faintest, about as bright as the pole star, it will not be a very easy object for naked eye view at any time during the two months' period, but it can be seen, under good weather conditions at any rate, during November. Its motion among the stars is about 50° almost due eastward, from a position in *Scorpio*, about 4° north of the first magnitude star *Antares* thru *Sagittarius* to the western border of *Capricornus*. During the first half of December it moves eastward a short distance north of the "Milk Dipper" group in *Sagittarius*. Its actual distance from the Earth is still increasing slowly and will continue to do so until some time toward the end of February, about the time of conjunction with the Sun. It will reach its perihelion at almost the same time. *Mercury* and *Mars* are in conjunction on December 22nd, but both are too near the Sun for easy naked eye observation on that date.

Jupiter passed opposition with the Sun on October 23d, and consequently will be above the horizon nearly all night in November. It will set earlier each night by about four minutes, so that at the end of December it will set at about half after 1 A. M. It is in the eastern part of *Pisces* and its motion up to December 21st is about 3° westward and 1° southward. During the rest of the month it moves very slowly eastward. When at its extreme westward position on December 21st it is in almost exactly the same place among the stars which it held on June 1st, being only $10'$ south. On account of its considerable distance there is comparatively little change in its apparent brightness due to the relative

positions of planet, Sun, and Earth, less than one magnitude between brightness at conjunction and at opposition.

Saturn is getting into better position for evening observation. On November 1st it rises at 10:20 P. M., and at about six in the evening at the end of December. It is in *Cancer* and moves eastward up to November 12th. During the rest of the period it moves about 2° westward. The apparent minor axis of the rings is very slightly larger than it was during the last period, but is distinctly smaller than the polar axis of the planet.

Uranus sets shortly before midnight on November 1st and before 8 P. M. on December 31st, but is still in fair position for evening observation. It remains in the constellation *Capricornus*, moving $1^\circ 42'$ eastward and $34'$ northward during the month. On November 1st it is a little less than 1° west and $0^\circ.5$ north of the small fourth magnitude *Capricorni*. On December 12th it passes $0^\circ.7$ north of the star, a distance about one-third greater than the apparent diameter of the Moon.

Neptune is in *Cancer* east of the position of *Saturn*.

THE SAN DIEGO MEETING OF THE PACIFIC
DIVISION OF THE AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE,
AND OF THE ASTRONOMICAL
SOCIETY OF THE PACIFIC.

The first meeting of the Pacific Division of the American Association for the Advancement of Science was held in San Diego, August 9 to 12, 1916, and was a success from every point of view. The officers and committees of the Pacific Division and of those of the affiliated societies which held meetings in conjunction with that of the Pacific Division planned the programs carefully, and the local committee on arrangements made every possible provision for the comfort and entertainment of the visiting members. The local committee was generously assisted in its work by the San Diego Chamber of Commerce, the Woman's Board of the Panama-California International Exposition, the staff at the Scripps